

AD-A164 831

COMPUTER-MEDIATED COMMUNICATION: DECISIONMAKING AND
INFORMAL INTERACTION. (U) NORTH CAROLINA UNIV AT CHAPEL
HILL INST FOR RESEARCH IN SOCIA. J BAREFOOT ET AL

141

UNCLASSIFIED

15 FEB 85 TR-7-ONR N00014-83-K-0279

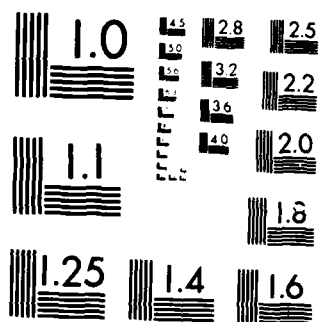
F/G 5/11

ML:

END

PALAPED

and



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

AD-A164 831

(12)

COMPUTER-MEDIATED COMMUNICATION:
DECISIONMAKING AND INFORMAL INTERACTION

John Barefoot, Beverly Wiggins, & Bibb Latane
University of North Carolina at Chapel Hill

Technical Report
February 15, 1985

DTIC
ELECTE
MAR 03 1986
S D

Reproduction in whole or in part is permitted for any purpose of the United States Government. This report was sponsored by the Organizational Effectiveness Research Programs, Office of Naval Research (Code 4420E), under Contract Number N00014-83-K-0279.

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

DTIC FILE COPY

86 3 - 3 007

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER TR-ONR-7	2. GOVT ACCESSION NO. ADA 164 831	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) COMPUTER MEDIATED COMMUNICATION: DECISION-MAKING AND INFORMAL INTERACTION		5. TYPE OF REPORT & PERIOD COVERED Final Technical Report
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) John Barefoot, Beverly Wiggins, Bibb Latane		8. CONTRACT OR GRANT NUMBER(s) N00014-83-K-0279
9. PERFORMING ORGANIZATION NAME AND ADDRESS Institute for Research in Social Science University of North Carolina Manning Hall 026A Chapel Hill, NC 27514		10. PROGRAM ELEMENT, PROJECT, TASK AREA & REPORT NUMBER 61153N 42 RR 042 0801 NR 170-954
11. CONTROLLING OFFICE NAME AND ADDRESS Office of Naval Research Organizational Effectiveness Group (Code 4420E) Arlington, VA 22217		12. REPORT DATE February 1985
		13. NUMBER OF PAGES 16
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited. Reproduction in whole or in part is permitted for any purpose of the U.S. Government.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Decisionmaking, Computer-mediated interaction, Teleconferencing, Social Influence, Social Impact Theory		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The impact of computer-mediated communication on group processes was assessed in both formal decisionmaking and informal communications settings. Respondents, who were part of ongoing, three-person work groups took part in two decisionmaking tasks under either anonymous or identified conditions. The effect of these con- ditions on productivity (measured by time on task, amount of information generated and quality of information generated) and on accuracy of decision (compared with expert ratings) was examined. Measures of actual and perceived influence were also obtained. The data indicate that effective group communication can take (OVER)		

20. (cont.)

place in the computer-mediated environment and that anonymity had little effect on either performance quality or patterns of influence, perhaps because of the relative weakness of the identified condition in this research.

The data on informal interactions provide evidence for the feasibility of informal interaction and substantial communication of socio-emotional content via computer networks. The data suggest that the computer may not be as poor a medium for this sort of interaction as once supposed.

abstract: decisionmaking and teleconferencing

The impact of computer-mediated communication on group processes was assessed in both formal decisionmaking and informal communications settings. Respondents, who were part of ongoing, three-person work groups took part in two decisionmaking tasks under either anonymous or identified conditions. The effect of these conditions on productivity (measured by time on task, amount of information generated and quality of information generated) and on accuracy of decision (compared with expert ratings) was examined. Measures of actual and perceived influence were also obtained. The data indicate that effective group communication can take place in the computer-mediated environment and that anonymity had little effect on either performance quality or patterns of influence, perhaps because of the relative weakness of the identified condition in this research.

The data on informal interactions provide evidence for the feasibility of informal interaction and substantial communication of socio-emotional content via computer networks. The data suggest that the computer may not be as poor a medium for this sort of interaction as once supposed.

Keywords: Teleconferencing;

Computer Mediated (Panel Study);

Social Communication

Accession For	
NTIS CRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	

The growing popularity of computer networks in business and government has resulted in a significant portion of the nation's decisions being made with at least some reliance on them. It is therefore important to carefully assess the impact of computer-mediated communication on group processes. We need to know how this medium affects decisions and productivity so that we can use it effectively, capitalizing on advantages that it might have over face-to-face communication and minimizing its potential disadvantages.

Unfortunately, there has been little systematic empirical research on this issue despite a suggestive base of research dealing with television-mediated communication (Barefoot, 1978; Short, Williams, and Christie, 1976) and extensive discussions of the uses and potential benefits of computer networks (e.g., Turoff and Hiltz, 1978).

The most frequently expressed idea about the difference between mediated and face-to-face interaction is that mediation diminishes the social impact (Latane', 1981) of the interaction. The various media can be arrayed on a dimension corresponding to the degree to which they reduce social impact (Barefoot, 1978; Short, Williams, and Christie, 1976). Computer-mediated interaction is thought to have relatively large diminishing effects on social impact. Social impact may be even further reduced in computer settings when the interactants are made anonymous, a circumstance much more difficult in face-to-face interaction. What does this mean for group decision-making and productivity? The scant research which does exist suggests that the answer depends on the type of task. There is almost no evidence to suggest that electronic mediation interferes with the communication of objective information (Chapanis, 1972). On the other hand, performance on decision tasks involving interpersonal conflict is clearly affected by the medium (Barefoot and Strickland, 1982; Short, Williams, and Christie, 1976). There is little research comparing media with respect to their effects on purely affiliative interaction, but one would expect to find large differences, given the variation among media in the number of channels of communication which have been demonstrated to affect such interaction.

The data discussed in this paper were collected in the context of a project called the Computer-Administered Panel Study (CAPS). Respondents in the project were 96 UNC undergraduate students. The project consisted of the administration of over 100 questionnaires and experimental units to this panel of undergraduates who reported to weekly sessions over a 20 week period. All sessions were entirely computer administered.

While the CAPS project was not designed exclusively for research on teleconferencing and computer-mediated decisionmaking, the project did provide the opportunity to address several important questions of interest. Two group decision-making studies were specifically designed to test the effect of anonymity on group processes in a computer-mediated

setting. The manipulation of anonymity is, in effect, a manipulation of social impact and the studies were designed to assess the viability of apparently conflicting hypotheses about the relationship of social impact and performance. In addition, the project provided an opportunity to assess some of the features of computer-mediated informal exchanges. CAPS respondents were members of standing three-person groups, the members of which were allowed to exchange messages each week. Respondents had no specific tasks to perform in the course of this interaction, which was entirely voluntary. Analysis of these exchanges provides some evidence for the social psychological effects of computer-mediated, informal interaction.

Anonymity and Group Decision-making

Respondents took part in two decision-making tasks requiring the communication of information among group members. The tasks were structured to resemble the Delphi technique, a procedure which has been widely advocated as a technique to improve decision-making in computer networks (Turoff and Hiltz, 1978). Proponents of the Delphi strategy argue that member anonymity is desirable because it reduces the role of interpersonal, socio-emotional motives which supposedly interfere with the efficient operation of the group. This line of reasoning suggests that group decisions will be better with anonymity because members will be more likely to present their ideas and those ideas will be more fairly considered. On the other hand, one could argue from social impact theory that anonymity would reduce the motivational influence of the group on the members, leading to lower effort and poorer quality decisions.

In order to investigate this issue, it is necessary to find tasks which are adaptable to the Delphi procedure, require intragroup communication, and provide a measure of the impact of group deliberation on decision quality. We chose a variant of the "Lost on the Moon" problem (Hall, 1971), a task which is often used to demonstrate that intragroup communication improves decision quality. This task requires participants to formulate individual solutions to a problem, communicate with the other group members, and then solve the problem again in the light of that group interaction. The change in the quality of the proposed solutions is taken as an indicator of the effectiveness of group influence. We also administered a variant of the "Subarctic Survival Task" (Eady, 1980). This task has the same structure as the "Lost on the Moon" problem, but presents a different set of intellectual problems to the participants.

In the lunar survival task, respondents were asked to assume that their spacecraft had crash-landed on the moon 200 miles away from their mother ship. They were given a list of fifteen objects which they were to rate according to their usefulness for the journey back to the mother ship. The items (see below) were rated on a 1 to 100 scale, a methodological difference from the practice in other studies, in which the items have been ranked, rather than rated. The items were presented to the respondents

for rating one at a time, followed by an opportunity to change any response after the completion of the full set of initial ratings.

TABLE 1: Stimulus Items in Lunar Survival Task

Expert Rank	Mean Pre Rating	Mean Post Rating
-------------	-----------------	------------------

1. Two 100-Pound Tanks of Oxygen	57	54
2. Five Gallons of Water	89	94
3. Stellar Map (of the Moon's Constellation)	75	79
4. Food Concentrate	83	85
5. Solar-Powered FM Receiver-Transmitter	82	87
6. Fifty Feet of Nylon Rope	53	58
7. First-Aid Kit Containing Injection Needles	64	65
8. Parachute Silk	37	43
9. Self-Inflating Life Raft	23	23
10. Signal Flares	72	65
11. Two .45 Caliber Pistols	21	14
12. One Case of Dehydrated Milk	57	54
13. Solar-Powered Portable Heating Unit	59	64
14. Magnetic Compass	46	32
15. Box of Matches	20	11

Following the ratings, respondents were asked to explain and justify the ratings they had made. They were given up to two lines to write comments about each item.

In the identifiable condition, respondents knew that they would be exchanging ratings and comments with members of their regular group, who were identified by name and who, in turn, knew the identity of the respondent. In the anonymous condition they were told that they would be exchanging ratings and comments with others who would not know their name and whose identities would also remain unknown.

In the second session, respondents read the ratings and comments of the other two group members who had also proposed solutions to the task. They were also allowed to review their own ratings and comments from the previous session. The manipulation of anonymity was reinforced during this second session by associating this feedback with the names of the individuals when the person was working with his/her regular group or with letters (e.g., Member A) in the anonymous condition. After reviewing their group members' ratings and comments, respondents were asked to rate the 15 items once again, using the same procedure described above.

The data from this study consist of the following: two sets

of ratings of the importance of the fifteen items, one taken before intragroup communication and one afterwards; written comments by the respondents explaining their initial ratings to the other participants; respondents' ratings of how much they believed that they were influenced by the other group members; and respondents' ratings of their perceived influence over the other group members. From these data, a number of indices were constructed. The correlation of the respondent's ratings with the rankings of the same items by experts (NASA personnel) gave an indication of the quality of the solution. The correlation between the person's ratings before and after the communication was used as a measure of group influence on the individual. The extensiveness (time, number of lines) of the comments was used as an indicator of effort and an independent rating of informativeness of the comments provided another measure of performance quality.

The arctic survival task was administered using the procedure just described. Only the setting of the problem and the items to be rated differed from the Lost on the Moon task. In Arctic Survival, respondents were asked to assume that their plane had crashed in an area of subarctic tundra. They were given information about the geography and the weather conditions likely to occur. In light of this situation, they were asked to rate the fifteen items listed below on their importance for survival. Despite the apparent similarities, the Arctic task was quite different from the lunar survival problem in that the correct uses of the items were less likely to be found by insight based on knowledge of basic facts about the environment (e.g., there is no air on the moon) and more likely to require creativity and detailed analysis of the situation. For the arctic survival task, the correct answers were defined by the ratings of members of a Canadian rescue force.

TABLE 2: Stimulus Items for Arctic Survival Problem

	Mean Pre Rating	Mean Post Rating
1. 13 Wood Matches in Waterproof Containers	87	91
2. Hand Axe	79	82
3. 20X20" Piece of Heavy Duty Canvas	79	83
4. Sleeping Bag Per Person	90	94
5. Gallon Can of Maple Syrup	51	68
6. 250 ft. of 1/4 Inch Nylon Rope	71	76
7. 3 Pairs of Snowshoes	78	80
8. One Aircraft Inner Tube (Punctured)	36	39
9. Safety Razor Kit with Mirror	47	56
10. Operating 4 Battery Flashlight	72	75
11. Fifth of Bacardi Rum (151 proof)	51	57
12. Wind-up Alarm Clock	24	25
13. Magnetic Compass	82	84
14. Book Entitled <u>Northern Star Navigation</u>	58	57
15. Bottle of Water Purification Tablets	70	63

SUMMARY OF RESULTS

Anonymity and Performance

The primary issue in this study was the impact of member anonymity on group performance in a decision-making situation. There are a number of measures relevant to this question and, therefore, several comparisons were of interest.

The most basic and most obvious outcome measure was the accuracy of the proposed solutions. Accuracy was assessed via correlations between the ratings of the respondents and the rankings of the items made by the experts, NASA in the case of the Lunar survival problem, and a paramilitary rescue group for the Arctic survival problem. These correlations were transformed into z-scores before analysis. One correlation was calculated using the ratings from Session 1, before the communication with group members (pre), and another correlation from session two, after the respondents had seen the ratings and comments of the others in their group (post).

The results are summarized in Table 3. There was a significant difference between the two tasks in the level of agreement with the experts, $F(1,91)=41.4$, $p<.001$. This was one of several indicators that the problems are different in a fundamental way. Within-group communication improved the ratings, $F(1,91)=109.12$, $p<.001$.

The tendency for post-communication indices of accuracy to be higher when the respondents worked with their regular group members than when they communicated anonymously was not statistically significant.

TABLE 3

Mean Correlation Between Respondent and Expert

Lunar			
Anonymous		Regular	
Pre	Post	Pre	Post
.54	.62	.57	.67
Arctic			
Anonymous		Regular	
Pre	Post	Pre	Post
.28	.36	.31	.40

Effort. Comments written by respondents in the first session were used to assess their level of effort and investment in the task. There were no significant differences in the quantity of textual material (number of lines). Independent judges rated each comment for informativeness (not correctness) into three categories: uninformative, when respondents failed to write anything or when they wrote something with no information value (e.g. "I don't know." or "What would you do with this?"); moderately informative, when the comment contained a statement suggesting a use for the object or giving an explanation why it was ranked high or low; and highly informative if the respondent explained his/her ranking by relating it to some quality of the environment faced in the problem (e.g., "Matches are useless because there is no air on the moon.", "Compasses don't work in the arctic."). No attempt was made to assess the accuracy of the comment, only the degree to which it enhanced the information base available to the other group members. Significantly more comments in the Lunar survival task were "highly informative" than in the Arctic survival task, reflecting the task differences mentioned above (Table 4, $F(1,91)=14.39$, $p<.001$). The tendency for comments to be more informative when respondents were communicating with their regular group members was not significant.

TABLE 4

Percentage of Comments in Each Informativeness Class
By Task and Condition

		Informativeness		
		Non	Moderate	High
Lunar	Regular	17	58	24
	Anonymous	14	56	30
Arctic	Regular	17	64	19
	Anonymous	17	63	20

Finally males tended to spend longer on the rating task than women, $F(1,91) = 3.08$, $p<.10$, and respondents working with their regular group members tended to take longer on the task, $F(1,91) = 3.03$, $p<.10$.

TABLE 5

Mean Pre-Post Correlations By Condition

	Lunar		Arctic	
	Anonymous	Regular	Anonymous	Regular
Males	.89	.85	.83	.87
Females	.82	.73	.81	.83

Female respondents showed lower correlations between their pre- and post-discussion ratings (indicating more change) than males Table 5, [$F(1,91)=4.22$, $p<.05$]. There was a marginally significant ($p=.07$) interaction of group type and task, showing more change in the identifiable condition on the Lunar task, but not on the Arctic task.

The pre-post correlation reflects only the amount, not the direction of change, so it does not reflect whether respondents were influenced by their groups nor whether they improved. Therefore we computed partial correlations between respondents final ratings and the pre-discussion ratings of the other two group members, controlling for the respondent's own pre-discussion ratings. In effect, this gives an indication of how much of the respondent's change can be accounted for by changes toward the pre-ratings of each of the other group members.

To produce a measure of the magnitude of this effect, disregarding the source of the influence, the partial correlations were averaged across the two group members.

TABLE 6

Mean Partial Correlations With Partner's Original Ratings
Averaged Across Influence Sources

	Lunar		Arctic	
	Anonymous	Regular	Anonymous	Regular
Males	.69	.70	.59	.53
Females	.79	.89	.63	.71

As was found in the analysis of the unadjusted pre-post correlations, females showed more evidence of being influenced, $F(1,89)=9.59$, $p<.01$. Unlike the previous analysis, however, respondents were more influenced in their ratings on the Lunar survival problem, $F(1,89)=16.52$, $p<.001$, indicating that although

no less likely to change their ratings, they were less likely to change them in the direction recommended by their fellow group members. This confirms the characterization of the two tasks as different in the amount of creativity and analysis necessary to arrive at a "correct" solution. Many answers for the Lunar survival items are rather obviously correct once they have been proposed (e.g., matches won't work without air), but the correct answers on the Arctic task (e.g., canvas would be important in making a lean-to) lack this self-evident quality and, therefore, are less likely to influence the ratings of the other group members.

The availability of self reports of influence allows us to examine the relationship between perceptions of influence and actual influence. A measure of this relationship is the correlation between the ratings of perceived influence and the z transform of the partial correlation between the respondent's post ratings and the pre-ratings of the relevant group member (see above). Since there were two group members for each respondent, there are two such correlations for each condition.

TABLE 7

Mean Correlations between Perceived Influence and Partial Correlation between Respondent's Pre-Ratings and Post Ratings of Group Member

	Lunar Survival	
	Anonymous	Regular
Males	.19	.49
Females	.05	.27
	Arctic Survival	
	Anonymous	Regular
Males	.16	.51
Females	.41	-.1

Only identifiable males were consistently accurate in their self-reports influence.

DISCUSSION

Effective group communication can take place in the type of computer setting employed in CAPS. The quality of the group decision improved significantly after group interaction in both

tasks, although the solutions to the Arctic survival task did not attain a high level of agreement with the solutions proposed by the experts. This was probably due to the difficulty of the task. Anonymity produced little effect on either performance quality or patterns of influence. This may have been because of the weakness of the manipulation in this type of setting-- perhaps respondents do not feel strongly identifiable, even when interacting with the members of their regular group. The study was not conducted in a face-to-face setting with all of the personal cues associated with day-to day interaction. Most respondents had never seen the other members of their group. In addition, the interactions which took place in these groups were primarily unstructured and affiliative, which means that status hierarchies characteristic of face-to-face work groups may not have developed. These factors could have diminished the difference between the anonymous and identifiable conditions, and weakened the impact of the manipulation. It should be noted that other studies involving CAPS respondents which have used the anonymity manipulation have usually shown consistent, but weak trends which were only marginally statistically significant.

Despite the fact that many effects were not statistically significant, some intriguing trends emerged from the data which suggest that anonymity may be of interest in future research on group decision-making. In particular, it appears that females were more influenced by males in the identifiable condition, but claimed the opposite. There are also trends for respondents to take longer when working with their regular group members, but to produce fewer high quality comments.

The findings showing sex differences in performance, influence, and attributions point to gender as an important variable for this type of research and suggest that future research should employ tasks appropriate for both sexes, avoiding the exclusive use of tasks which are especially interesting or easy for either males or females.

INFORMAL COMPUTER-MEDIATED INTERACTION

During the past twenty years, social scientists have given some, but perhaps insufficient, attention to the study of human communication through electronic media such as the telephone, closed circuit television, teleconference devices, and, most recently, conferencing via computer terminals. As these modes of communication increasingly replace (or at least augment) face-to-face interaction, the need to understand if and how they differ from face-to-face interaction becomes more important.

THE SETTING

As described earlier, each respondent was a member of a three-person group and was allowed to exchange messages with the other two group members during each of the 20 CAPS sessions in an informal teleconference.

Respondents reported at a scheduled time to weekly sessions which lasted about 60 minutes. Group members did not attend at the same time, so their interactions did not take place in "real time" like face-to-face and telephone conversations do. Rather, at each session, subjects read the messages sent by their two group members the previous week and then sent a single message which would be viewed by both of their group members the following week.

The resulting data are among the scant empirical evidence available to address the question of how computer-mediated interaction differs from face-to-face and interaction mediated by other means.

During the twenty weeks of the project, respondents were members of two of these interacting groups... one in the fall (first eight weeks of the project) and one in the spring semester (weeks nine through twenty). In the fall, all groups were mixed sex, with equal numbers of MMF and FFM groups. In the spring, the fall groups were disbanded and new groups were formed.... this time, equal numbers of same and mixed-sex groups (MMM, FFF, MMF, FFM). None of the spring groups contained members who had also been in the same fall group.

At the first session in each semester, respondents were introduced to their two group members by name and told that they would sometimes work on project tasks with these two members. They were informed that they would be given the opportunity to send and receive messages each week and were told to use that opportunity to get to know each other better. Later, respondents were asked not to exchange specific information about project tasks unless told it was permissible to do so. They were told that it was permissible only within the context of project tasks in which interaction was "built in" as part of the task itself. The "teleconference" opportunity was thus reserved for less formal exchanges. This characteristic differs from most experimental studies of mediated interaction in that group members have no specific task to perform during the course of their interaction. In addition, interaction was entirely voluntary (subjects could choose not to send a message in a particular week). Subjects could send as few or as many lines of message as they desired (up to 20 lines). Their ability to edit was limited to a single line at a time (i.e., once a line was "entered", they couldn't go back and make changes to it).

DESCRIPTION OF INTERACTIONS

We were somewhat concerned in the very beginning of the project that the lack of more specific instructions regarding the teleconferences might result in a large number of "no message" or very short messages. This did not prove to be the case. Respondents almost always sent messages to their group members and these were often quite long and very sociable. [Table 8A gives some examples of messages sent during the first session of

the project and Table 9 presents the mean numbers of words written per session. There is a significant sex difference, with female respondents writing more than did the males, $F(1,73) = 3.61$, $p = .06$. There is also a significant time trend, with fewer words written in later sessions, $F(16,1168) = 10.63$, $p < .01$. This may signify a tendency for less information to be exchanged across time, or it may reflect the development of greater communication efficiency (same information in fewer words).

Table 9 also contains two indicators of message content, the mean numbers of first person pronouns per session and the mean proportions of words which are first person pronouns. These variables give us some indication of the degree of self-involvement in the group sessions. Females used more first-person pronouns than males, $F(1,73) = 5.36$, $p < .025$, and fewer first-person pronouns were used in later sessions, $F(16,1168) = 10.08$, $p < .01$. This could be due to the large between-session differences in total word production, however, so the ratio of first-person pronouns to total words was analysed to control for this confounding. This analysis entailed a significant loss of observations because no ratio could be computed in those instances when no message was sent. There was no significant sex effect on the proportion variable, but a significant session effect remained, $F(16,704) = 2.09$, $p < .01$. The form of the effect is far from the type of linear trend observed with the other variables, however. The primary source of the significance is the departure of the means for Sessions 1 and 9 from the levels observed in the other sessions. Since these two sessions were the first in each semester, the high rate of self-referencing is likely due to the process of self-introduction to new group members.

TABLE 9

Mean Word Counts and Mean Self-References By Sex and Session

Session	Words		Pronouns		Ratio	
	M	F	M	F	M	F
1	52.4	77.8	4.1	7.1	.074	.090
2	79.2	81.7	5.6	5.8	.066	.065
3	67.0	64.4	4.4	4.9	.066	.071
4	64.6	76.2	4.5	5.5	.061	.068
5	56.9	68.2	4.1	5.2	.070	.074
6	65.9	85.1	4.4	6.7	.062	.075
7	59.2	71.9	5.0	6.8	.073	.092
8	46.7	64.3	3.5	4.9	.068	.071

TABLE 9 (Cont.)

Session	Words		Pronouns		Ratio	
9	49.5	61.1	3.3	3.9	.077	.068
10	47.3	60.1	2.5	4.4	.070	.060
11	49.8	65.0	3.3	5.1	.060	.074
12	36.6	50.4	2.2	3.3	.057	.058
13	44.3	50.0	3.2	3.6	.060	.070
14	37.8	51.9	2.4	3.9	.066	.059
15	44.1	51.9	3.2	3.2	.074	.053
16	40.5	49.8	2.8	3.7	.031	.035
17	43.0	52.4	3.0	3.1	.031	.037

The most obvious psychological difference between computer-mediated interaction and other forms (other than mail, perhaps), is the smaller number of communication channels used in the former. Visual information, such as attractiveness, social categorization, facial expression, eye contact, and body language, and vocal cues, such as inflection and intonation, are not available via the computer terminal. Depending upon the purpose of the interaction, this lack of "richness" may be seen as a disadvantage or as an advantage. On the one hand, we have all spent years learning to emit and read a complex set of cues in face-to-face situations, and we may feel awkward about having to express ourselves or to interpret the behavior of others without these cues. Some studies, including analyses of Nixon's interactions with White House aides, both face-to-face and via telephone, have indicated that we do have a tendency to treat others less humanely (e.g., are more likely to ignore or insult) via the more distant media. Audio-only communications are more likely to be depersonalized, argumentative, and narrow in focus compared with face-to-face interactions. On the other hand, there is some evidence (Short, Williams, and Christie, 1976) that the visual cues present in a face-to-face situation distract participants from other, perhaps more reliable, cues or from formulating their own arguments and from understanding the other's arguments. Hence the finding that persuasive attempts may be less effective when presented face-to-face than through other "less rich" media and that lying may be more accurately detected via audio-only than face-to-face (Reid, 1970, reported in Short, et al., 1976).

Some have hypothesized that, over the course of interaction via the less rich media, such as computer conferencing, norms will develop so that the interactants substitute other cues for the missing visual and verbal ones. There is anecdotal evidence

for this in our own data. For example, perhaps because it is difficult, when visual cues are absent, to know how to interpret someone's failure to respond to a message (... eg. is it disinterest, reluctance to indicate disagreement, dislike, is the person away or ill or busy), subjects tended to give written excuses to their group members for missed messages or for short ones. [See Table 8.B for examples.] Another example of substituted cues are "written vocalizations". These are such expressions as "ha-ha", "boo-hoo", "oops", "whoops", "yeah" and "yuck". [See Table 8.C for examples.]

Preliminary coding indicates that the amount of informational vs. socio-emotional content changed over the course of the interaction. As might be predicted, informational content is greatest early in the interaction and the socio-emotional content increases over time.

DISCUSSION

While largely anecdotal, the data described in this section do provide evidence for the feasibility of informal interaction via computer networks. The very fact that such interaction was undertaken and maintained on a voluntary basis by virtually all respondents is reason to believe in its importance. The substantial levels of socio-emotional content are evidence that this aspect of mediated interaction should not be ignored. More systematic studies of the use of written vocalizations and other cues which might serve as substitutes for channels of communication which are available in more "rich" media should address the question of their effectiveness in communicating both affective and informational content. Computer-mediated interaction may not be as poor a medium as one might suppose.

REFERENCES

- Barefoot, J. C., Functions and consequences of nonverbal behavior in mediated communications settings. Report to the Canadian Department of Communications, 1978.
- Barefoot, J. C. and Strickland, L., Conflict and dominance in electronically mediated interaction. Human Relations, 1982, vol. 35, 559-566.
- Chapanis, A., Studies in interactive communication: The effects of four communication modes on the behavior of teams during cooperative problem solving. Human Factors, 1972, vol. 14, 487-509.
- Eady, P. and Lafferty, J., The Subarctic Survival Situation Manual, Plymouth, Michigan: Human Synergistics, Inc., 1980.
- Hall, J., Decisions, decisions, decisions, Psychology Today, Nov. 1971, 51-88.
- Hiltz, S. R. and Turoff, M., The Network Nation: Human Communication via Computer. Reading, Mass: Addison Wesley, 1978.
- Latané, B., The psychology of social impact. American Psychologist, 1981, vol. 36, no. 4.
- Short, J., Williams, E., and Christie, B., The Social Psychology of Telecommunications. London: John Wiley and Sons, 1976.

APPENDIX 1

Table 8: Examples messages

A: An initial message:

Hi, Eric. Hi, Debra.

This is really strange sending a message to two people whom I have never met and maybe never will. Oh well. It should be interesting. I am a junior zoology and (maybe) psychology major. I am from Chapel Hill. I live in Hamlin Park, near Eastgate. I enjoy research and am working in a lab in the anatomy department now. I am considering psychological research as a profession. I would like to work with abnormal psychology - maybe on a hospital ward or something. Other possibilities are psychiatry (which would require medical school), counseling (because so many people can not talk about their problems - they keep them all inside), or getting marr

Whoops... getting married and making babies (joke). Well, I could probably go on forever. You may have guessed that I like to talk. Maybe we can figure out who we are eventually. I am in here at 12:00 on Friday afternoons. If you are in the neighborhood, stop by and see me. I am the only one here. Well, I should see what wlse this crazy machine wants me to do. Goodbye, Robin.

B: Some excuses for short messages:

GINNY AND STEVE-

I'M LATE FOR MY RIDE TO WILMINGTON (SUMMIT MEETING WITH MY GIRLFRIEND'S PARENTS) SO I'LL MAKE THIS SHORT. STEVE, I DID SEE THE POLICE THIS WEEKEND. WE HAD BOX SEATS 30 FEET FROM THE STAGE- WAS THE WAY THEY PLAYED "ROXXANNE" GREAT, OR WHAT?!

GINNY, I AM A JOKELESS WONDER, SO I HAVE NOTHING TO ENTERTAIN YOU WITH. GOT TO GO, WOULD HATE FOR THE IN-LAWS TO GET PISSSED OFF!

-MIKE

Hi! Hope you two are having a nice week. I've got three papers that I have to work on, so I'd better go. Don't study too hard! Talk to you later. Bye.

ITS WEDNESDAY EVENING, IM TIRED AND REALLY CANT THINK OF MUCH TO SAY. HOPEFULLY I WILL BE MORE CREATIVE NEXT WEEK.

C: Examples of written vocalizations and jokes

HELLO, MY NAME IS GALE, (LIKE THE WIND), AND I AM LOOKING FORWARD TO MEETING YOU TWO. I AM 19 (NOT 18, THANK GOD). I AM A SOPHOMORE AND I AM FROM DURHAM. I AM SUPPOSEDLY MAJORING IN COMPUTER SCIENCE. I WOULD ASK YOU A QUESTION ABOUT YOURSELF BUT SEEING AS YOU CAN'T ANSWER ME RIGHT NOW, I WON'T. WHAT CAN I SAY? LET'S SEE. DO YOU LIKE JOKES? WHAT IS BLACK AND WHITE AND BLACK AND WHITE AND BLACK AND WHITE?.....GIVE UP?..... A NUN FALLING DOWN THE STAIRS. HAAAAAAAAAAAA! HA! HA! I CAN SEE THE TEARS COMING OUT OF YOUR EYES SINCE YOU ARE LAUGHING SO HARE. GIVE ME A BREAK. IT WAS THE ONLY JOKE I COULD THINK OF. WELL, IT WAS NICE MEETING YOU TWO. HAVE A NICE WEEK!!!!!!!!!!!!

What do you think about the Tarheels losing their first game? I think it's terrible. I almost cried. But I held back. You must be strong in this big, bad world. Haa! Ha! Well, I dropped my Physics class so you won't have to hear me complain anymore!! Today is Valentine's Day so I hope you guys have a great one. Too bad you won't see this until next week. Oh well..... See ya later.....Gale

Hi guys!

EXCUSE ME????? Lost again, did someone say? I'm doing quite well, thank you. Except I know how you feel in Physics, Gale. I can't even hang with Bio 11. And my major is supposed to be nursing. Thinking about all that Chem scares the _____ out of me. Be a PE major. Michael, I wouldn't want to be in your position either. I'm having TOO MUCH FUN!!! (Maybe that's why I can't hand with Biology!) You guys are cool. My groopies last time were twits. Let's all go out for some calories sometime, preferably in the form of ice cream. Michael, honey, does someone need to teach you how to type? (Haha, I couldn't resist--it sounds just like something I would do.) Later, Jenn

HI YOU GUYS! I DON'T KNOW WHY THIS IS PRINTING EVERYTHING IN CAPITALS, BUT I DON'T WANT TO FOOL AROUND WITH IT TO FIND OUT! STEVE, WHAT DO YOU MEAN MY NAME IS IN ALL CAPITALS, WHEN? IT'S SO FUNNY TO HEAR YOU WERE OUT ON HALLOWEEN, SAND(OOPS) GALE BECAUSE I WAS TOO AND I PROBABLY SAW YOU AND OF COURSE DIDN'T KNOW YOU. OH WELL. NOTHING INTERESTING AND NEW TO TELL, JUST SCHOOL AS USUAL! I WENT HOME OVER FALL BREAK WITH A FRIEND AND WE WENT TO NEW YORK CITY AND THAT WAS GREAT BUT OTHER THAN THAT... WELL I CANT THINK OF ANYTHING ELSE TO SAY. HOPEFULLY NEXT TIME I'LL HAVE AN UNBELIEVABLE EXPERIENCE TO SHARE(HA! HA!) HAVE A GOOD WEEK.

Hi, y'all....it's rainy and gross our, so I'm not feeling real talkative today. We're going to have to get together and since Gino's a youngster (teehee), maybe we could meet somewhere on campus...like Fast Break. The Pi ne Room?Yum-yum!Do y'all like milkshakes? Or chinese food?

END

FILMED

4-86

DTIC